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MATERIAL ON JUNE 1980 ALL-UNION
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MATERIAL ON JUNE 1980 ALL-UNION CONFERENCE ON DEVELOPMENT OF SIBERIA

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 12, 1980 (signed to press 12 Nov 80) pp 3-57

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[Text] In June 1980, in Novosibirsk, an all-Union conference was held on the subject of "The Development of Siberia's Productive Forces." Similar conferences have been called approximately once every 10 years (the last one was also held in Novosibirsk in 1969), and each of them has marked a definite stage in studying the productive forces in the east of our country.

The 1980 conference was a very representative one. Assembling at it were around 2,000 persons from all the krays, oblasts and autonomous republics of Siberia. Participating in the conference were the Secretary of the CPSU Central Committee M. V. Zimyanin, the Deputy Chairman of the USSR Council of Ministers and the Chairman of the State Committee for Science and Technology [GKNT], Academician G. I. Marchuk, the President of the USSR Academy of Sciences, Academician A. P. Aleksandrov, the Deputy Chairman of the USSR Gosplan N. P. Lebedinskiy, the deputy chairmen of the RSFSR Council of Ministers N. I. Maslennikov and L. P. Lykova, the Chairman of the Siberian Division of the Academy of Science, Academician V. A. Koptug, RSFSR and USSR ministers, first secretaries and secretaries of the Siberian party obkoms and kraykoms, executives of the CPSU Central Committee, the chairmen of state committees, and leading scientists of the nation and the Siberian Division of the Academy of Sciences. The work of the conference was broken up into 18 sections which brought together scientific and practical workers from Moscow, Leningrad, Novosibirsk, Irkutsk, Krasnoyarsk, Tomsk, Tyumen' and many other cities. The leaders of the Siberian Division of the Academy of Medical Sciences and the Siberian Division of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin [VASKhNIL] also prepared papers for the conference.

The work of the conference lasted 4 days and extensive recommendations were approved. Speaking at the final plenary session was M. V. Zimyanin.

The significance of the 1980 all-Union conference on the development of Siberian productive forces is very great, and not only for the eastern regions of the nation. For this reason we have decided to present a report on the conference in order to acquaint the readers with its ideas and conclusions.

Report on the All-Union Conference on the Development of Siberia's Productive Forces

In speaking with our correspondent, Academician Boris Sergeyevich Sokolov, in summing up his impressions on the work of the conference, jokingly commented that in the vocabulary of reporters at the end of the century, the word "Siberia" will probably be the most frequently used word. More often than now? Undoubtedly because the great economic hopes of the entire nation are linked with Siberia and these hopes are fed not by fantastic proposals but rather by discoveries and forecasts. And it is quite apparent that the importance of Siberia in the flourishing of our state will grow with every passing five-year plan.

This notion expressed by us in such an "unscientific" manner is based upon extensive scientific exploration by the national geological service (around 1 million persons, including all subdivisions from the scientific institutions up to the exploratory drilling brigades). The interest of this service in the eastern regions of the nation has been stimulated both by the remarkable results of exploration in recent decades as well as by the raw material needs of our economy in future decades. This notion can be presented also in the form of tables and involved calculations and which are the concern of our economists and power engineers and the representatives of many extracting sectors and planning organizations who view Siberia primarily as the basic source of fuel and energy resources in the nation both today and even more, tomorrow.

If one accepts this idea as the initial one (the arguments affirming its indisputability will be given in the course of the report), one might then endeavor to provide the most general definition of the problem of concern to the conference participants. This is: How should Siberia be developed from the standpoint of the entire national economic complex of the Soviet Union?

From this viewpoint let us endeavor to approach the entire abundance of conference materials which are based upon the previously published scores of monographs supplemented later by hundreds of pages of minutes from the plenary sessions and the summation reports on the work of the 18 sections.

But first of all it is essential--both for the reader and for oneself--to have a clear notion of what Siberia is today and what trends can be noted in its development over the last 10 years.

1. The Turbulent Seventies

The last 10 years have been truly a stellar time for Siberia. First of all, during this entire period Siberia developed more rapidly than the national economy. This lead commenced approximately in 1965. It was due both to the formation of the Western Siberian oil and gas complex as well as the accelerated development of the Angara-Yenisey region and the construction of the Baykal-Amur Mainline [BAM].

From the speech by the Deputy Chairman of the USSR Council of Ministers and Chairman of the GKNT, Academician G. I. Marchuk

All that has been done and is being done in Soviet Siberia is a feat of science and labor, the party and people.

From the speech of the First Secretary of
the Tomskaya obkom Ye. K. Ligachev

Let us begin with details from the general picture.

Some data from the statements by the leaders of party and soviet organizations in the Siberian oblasts, krays and republics.

Over the last decade the fixed productive capital in Yakutia has increased by 3-fold.

In the Ninth Five-Year Plan Krasnoyarskiy Kray completed 450 enterprises, and virtually every 3 days Siberian industry here received new productive capacity. The result of the Tenth Five-Year Plan should be the completion of 330 industrial projects, many of which are of national importance.

The economy of Tomskaya Oblast over the last 15 years has received 3.3-fold more capital investments than in all the previous years of Soviet power.

The increase in the fixed productive capital of the Tuva ASSR over the 4 years of the Tenth Five-Year Plan has risen by almost 60 percent in comparison with the increase in the same years of the Ninth Five-Year Plan.

Data from the report of the Chairman of the RSFSR Gosplan, N. I. Maslennikov:

"Over the 4 years of the Tenth Five-Year Plan 1.5-fold more capital investments were channeled into the economic and social development of the Siberian and Far Eastern regions than in 1971-1974; housing construction allocations totaling 8 billion rubles have been turned into new housing with a total area of around 50 million m², and this has improved the housing conditions of 5 million persons.

"Over the 5 years, 255 new secondary general education schools and 85 vocational-technical schools have been opened up in Siberia; the average wages of Siberians has increased by 18 percent, and is 195 rubles a month in Western Siberia and 210 rubles a month in Eastern Siberia.

"Over the last 3 five-year plans, 18 new VUZes and 53 specialized secondary schools have been opened up in the regions of Siberia and the Far East, the number of VUZ students has increased by 35.5 percent, and the number of students in the specialized secondary schools has risen by 16 percent."

All these facts and figures concern investments into Siberia.

Now a word about its contribution to the national economy.

The USSR Minister of Geology Ye. A. Kozlovskiy in his report at the conference gave the following comparison: In 1964, Western Siberia produced its first 200,000 tons of oil, but on 1 January 1980, 1.5 billion tons had already been extracted from the ground here!

In 1975, the miners of the Kuznetsk Basin provided the nation with 137 million tons of coal, and in 1980, around 150 million tons. This means that the Kuznetsk Basin presently supplies one-quarter of the hard coal and one-third of the coking coal of the nation.

Academician A. G. Aganbegyan has summed it up: In 1980, in terms of the output of fuel and energy resources Siberia will outstrip the European USSR and the Urals taken together. It will produce around 40 percent of the nation's fuel. Around 15 percent of it remains in Siberia, and the remainder of over 600 million tons of conditional fuel units is sent to the European USSR. And soon the figure will be 700 million tons....

These are only a few features in the portrait of Siberia the producer.

This has become possible due primarily to the geologists about whom Sergo Ordzhonikidze once said that they can enrich the nation but they can also ruin it.... The Siberian discoveries, fortunately, have confirmed the first part of this prediction and, looking back, the Tyumen' prospectors at the conference assessed the Eighth and Ninth five-year plans as years of bright victories for the Tyumen' geologists, when the effectiveness of investments on exploration and the extraction of Siberian oil was 5.5-5.6-fold higher than the national average, while for gas production it was 14-fold higher than the national average (in the Eighth Five-Year Plan) and 48-fold higher (in the Ninth)!

This has become possible also as a result of a certain reevaluation of the importance of solid fuel as the advisability of using it was once in doubt because of the growing flow of oil and gas from the large deposits as well as because of the attractiveness of the glowing prospects of nuclear energy. (Incidentally, it might be pointed out that at the 1969 conference there was not even a section on the coal industry, although all in all there were some 15 sections, but minds were under the sway of oil and gas while coal seemed to be a raw material that was if not completely written off at any event was less interesting and less promising). However, life has rather quickly restored the somewhat shaken reputation of coal. At present coal plays the role of one of the leading energy resources, and this to a significant degree also determines the role of Siberia where 85 percent of the national reserves of this "black gold" are located. The Kuznetsk Basin will remain the major coal basin of the nation over the immediate future, and its present importance could be illustrated in the following manner. One-third of the domestic metal is cast from Kuznetsk coals. A new large coal mine, the Neryungri, in Southern Yakutia has begun operating, and work is being developed to tap the brown coals of the Kansk-Achinsk Basin.

Finally, this has been possible because programs have been consistently carried out to develop the fuel and energy base of the nation in the Eastern regions. We have merely to recall the party and governmental decisions on the Western Siberian oil and gas complex, on the Krasnoyarsk ten-year plan (a decree which provided for the construction of large power plants and the creation of a new basis of electric power and energy-intensive production on this basis), on the Southern Yakutia coal complex, and one of the most recent, on the measures to further develop the Kuznetsk Coal Basin for 1981-1990 where, let us remember, plans were made to bring coal mining in the Kuznetsk Basin up to 193 million tons.

This is a matter of decisions of a strategic character.

In this regard the results of the Tenth Five-Year Plan are particularly eloquent.

Siberia is to provide over 90 percent of the total increase in fuel output, and for oil will produce not only the entire national increase but also compensate for the decline in output of more than 50 million tons in other regions of the nation.

As was emphasized by the President of the USSR Academy of Sciences, Academician Anatoliy Petrovich Aleksandrov, in speaking in Novosibirsk, precisely the Eastern regions are presently those areas where basically the entire increase in the production of fuel resources is to be found. The growth of their output in Siberia, and in particular, oil production, was termed by him turbulent, having pointed out that a more precise word could not be selected for describing the process occurring.

The past Siberian decade can also be termed turbulent for certain other items of economic development.

The section on ferrous metallurgy in its review stated that the past decade had been marked by high development rates for the sector in Siberia. The output of iron and rolled products in 1970-1978 increased by 1.4-fold, and for steel by 1.6-fold. But here we should immediately stipulate that this has been caused chiefly by the completion of new capacity at one enterprise, the Western Siberian Metallurgical Plant.

The Deputy Minister of Nonferrous Metallurgy V. S. Ustinov defined the results of the decade this way: The volume of capital investments into the Siberian enterprises of the sector rose by 80 percent in comparison with the previous decade. In terms of the share of nonferrous metals production Siberia even now holds the leading place in the nation.

Here it is difficult to refrain from the following example: the northernmost industrial center of Siberia, the Noril'sk Mining and Metallurgical Combine, over the last 15 years has increased the production of metals by several-fold as a result of the tapping of new deposits.

In speaking about the "turbulent seventies," one must certainly mention the BAM. The decision to build this railroad was taken in 1974, and at present around 2,000 km of the road have already been built and it is to become the core for the economic development of an enormous and rich territory. This main line has become the number-one national shock construction site. And along it one can also see hundreds of other construction sites. Particular mention in building Siberia should undoubtedly be made of the development of the construction facilities themselves as the capacity of these will determine the solution to many socioeconomic problems. Around a million Siberians work in construction and in the building structures and materials industry. Whether or not this is a large or small number is a somewhat abstract question. But if one imagines the projects built by their hands in the 1970's... Scores of mineral deposits have been equipped for exploitation. There are thousands of kilometers of pipelines. There is energy construction such as the Ust'-Khintayskaya and Ust'-Ilimsk GES, the first units of the Sayano-Shushenskaya GES and the Surgut GRES. There are the Nizhnevartovsk and Surgut gas processing plants. There are mines, roads and cities....

And here either pattern or a detailed list is impossible due to the multiplicity of projects. But among them we should point out those which mark a new quality in the Siberian economy, that is, the birth of a large processing industry.

At the 1969 scientific conference one of the debated questions was what should be done with the Siberian oil? More precisely, what was more advantageous to do with it, that is, to transport it in a crude state or develop refining? Economists proved the effectiveness of Siberian petrochemistry. And now they are being built: the Tobol'sk and Tomsk petrochemical complexes. And they are not just being built as the Tomsk complex has already produced its first product, Siberian propylene. And soon from the Tomsk polymers they will begin manufacturing light and strong parts for machinery and household appliances and structural elements. Tobol'sk is to refine unstable benzene, a raw material for producing synthetic rubber and other polymers.

The birth of petrochemistry is a major event in the turbulent seventies in Siberia. The same is true for gas processing about which quite recently on the pages of our newspapers the exultant message was flashed that next year four-fifths of the casing head gas in Tyumenskaya Oblast would be recovered. Any person who is even slightly familiar with the problem of the burning flares at the oil fields will easily understand the rejoicing on this question because the task of recovering this valuable flared-off raw material requires much capital investment and time for building complex production facilities.

These events are all the more noteworthy in that, in paying proper due to the change which has started with the appearance of oil refining and gas processing, one cannot help but note, to put it mildly, the timidity of this major trend in the economy of Siberia, that is, the turn to the integrated and complete processing of raw materials on the spot.

On the question of the same oil, research studies have affirmed that the growing needs of the national economy for light oil products has posed the acute problem for Western Siberia of increasing the completeness of oil refining. Calculations have shown that regardless of a number of cost-increasing factors, the total adjusted expenditures for producing a majority of the petrochemical products here, considering transport outlays and expenditures in related sectors, are noticeably less than in other regions of the country.

And what about lumber? There is no need to look for confirmation of an obvious truth in the figures that it is an incomparably more expensive gratification to burn up the chip than to organize pulp production from it. Nevertheless, the utilization of lumbering wastes in Siberia in essence is a question that has not yet been fully resolved.

And what about the nonferrous metal ores....

Incidentally, the reader has realized that it has been a discussion of building up the levels of Siberian industry. This very process is a source for sharply increasing the efficiency of the Siberian economy, but this is already a subject of a separate chapter from which we are separated by the necessity of saying at least a little about the state of the raw material base. The levels and superstructure are concepts which presuppose the presence of a foundation by which--with the

present interest of the state in Siberia--we must understand as the possibilities of the natural complex, or more precisely, our notions of them.

Siberia owes the seventies for sharply increasing the entire nation's attention to it.

The book "Kanada na Poroge 80-kh Godov. Ekonomika i Politika" [Canada on the Threshold of the Eighties. Economy and Politics] (Moscow, Nauka, 1979) quotes the words of a Canadian writer about what the seventies meant for Canada: For this country they became a "decade which deprived us of optimism." The enormous territory, the northern conditions, the small population, and development problems.... Canada is often compared with Siberia. But in using the assessment of the Canadian writer, it can be said that for Siberia the seventies were a decade of optimism.

But what about the future?

2. A Strategy Requires Knowledge

While in 1950 the entire world produced around 2 billion tons of mineral raw materials, at the end of the 1970's, output had increased to almost 12 billion tons. By the year 2000, demand will rise by 2-5-fold. Over the last 30 years of our century, the world will consume 3-4-fold more mineral raw materials than over the entire previous history of civilization. The USSR is the only state in the world which can virtually fully meet the demands of its developing industry from its own mineral resources. Over the last 25 years of the century, the USSR will extract as much mineral wealth as over the previous 100 years. Here a significant portion of the minerals will be extracted from Siberia.

From the report of the USSR Minister of
Geology Ye. A. Kozlovskiy

When the floor was held by representatives from the Siberian krais, oblasts and republics you inevitably would hear about the great, if not enormous, reserves of the most diverse minerals and often of such a range that one could not imagine anything better for creating one or another specialized complex. On this question the first secretary of the Tomskaya obkom, Ye. K. Ligachev mirthfully commented that in Siberia "there are no rich and poor, everyone is a millionaire."

The same thing holds true for the sectors. In speaking about reserves, oil workers use hundreds of millions of tons and coal workers talk about hundreds of billions of tons. Gas workers count in trillions of cubic meters. And if certain sectors must operate with humbler figures, this in no way compromises Siberia as a raw material source but merely describes the specific features of the raw material, for example, rare metals which are sometimes used in kilograms and grams and not tons.

A typical expression for the sectorial report was: "Relying on the exceptionally rich mineral and raw material base...."

Let us be a bit more specific.

Nonferrous metallurgy--Siberia holds the leading place in terms of the quantity of explored reserves of a number of nonferrous and rare metals.

Ferrous metallurgy--this has a firm base in the form of the iron ore deposits of Kemerovskaya Oblast, the south of Krasnoyarskiy Kray, the Angara-Ilim area in Irkutskaya Oblast, and the iron-bearing quartzite deposits in Charo-Tokinskiy Rayon in the south of Yakutia and the north of Chitinskaya Oblast.

Gas production--here in all the encyclopedias of the world, Siberia figures as one of the most important sources not only in the 20th but also in the 21st century.

Estimates on the coal reserves were not given.

As for oil, here an explanation is needed of the situation which has given rise not only to rejoicing, but also the rumors on the depletion of the oil pools of Siberia. This explanation does not contain anything new for persons familiar with the problem, but in assuming that among the readers there is an inevitable share of persons who are far removed from the oil and gas problems, a conscientious reporter must state what he learns. And here it would be best to quote the president of the Academy of Sciences. A. P. Aleksandrov said from the rostrum of the conference:

"Unfortunately, the very great success in developing the oil deposits of Siberia and Tyumenskaya Oblast has been accompanied by an insufficiently rapid rise in the explored oil reserves. At present the situation is being rectified, but systematic work is needed in this area."

Academician A. A. Trofimuk whose optimistic views on the oil and gas potential of Western and Eastern Siberia are well known has explained the acuteness of the problem by an underestimation of the development of prospecting and exploration work by the planning bodies and the Ministry of Petroleum Industry itself.

Corresponding Member of the USSR Academy of Sciences N. I. Nesterov feels that the question of the preparation of oil deposits for rapid industrial development is primarily a question of sharply increasing the volume of drilling, and if we succeed in drilling 10 million meters of exploratory wells in the 11th Five-Year Plan, then a stable increase in oil production will be guaranteed in Western Siberia in the 12th Five-Year Plan.

Thus, in the opinion of the most prominent specialists, the doubts which appeared at one time on the promise of Siberian mineral wealth were the result of a certain miscalculation in organizing prompt exploration and in no way a matter of the depletion of the reserves themselves. Geological activities of recent years (the exploration of more complex deposits, the shift to the north, the increase in drilling depth, and attention to new exploratory objects) have brought results which strengthen the positions won by Western Siberia as the basic oil-supplying base of the nation.

The calculations carried out by the TsENII [Central Economic Scientific Research Institute] under the RSFSR Gosplan for the territorial fuel and energy balance indicate that the supply of these resources in the economic regions of the nation over the long run will change substantially. While presently three economic regions--the Northern Caucasus, Volga and Western Siberia--have a positive fuel and energy

balance, while the remainder have a negative one, over the long run, just one, the Western Siberian Economic Region, will have an excess of fuel and energy resources over demand, and this excess will be more than 5-fold. Subsequently, Western Siberia will be joined by Eastern Siberia with the major Kansk-Achinsk fuel and energy complex and the new oil and gas deposits.

The complexity of tapping the new deposits is a matter of special discussion, and the task of the present article is to provide a review of the state of affairs in the raw material base of Siberia. We so often hear about the fabulous riches of Siberia that the notion of the poor exploration of its mineral wealth is not easily accepted. The listing of elements "by the Mendeleev table," the flow of large figures characterizing the prepared, explored and expected reserves, the mysterious names of scores of deposits which have become household words on the pages of the indefatigable newspapers which provide us with a daily opportunity to broaden our notions of the Siberian economy as mirrored by its achievements--all of this tends to form an opinion about Siberia as a natural complex which is well understood in all its components.

However this is not the case.

Of course, we know Siberia today incomparably better than at the moment of the opening of the First Scientific Research Congress on the Development of Siberian Productive Forces (December 1926 in Novosibirsk), when in his introductory speech the well known Siberian geologist, at that time Professor (later Academician) Mikhail Antonovich Usov said: "Everyone usually says that Siberia is paved with gold, but we do not have the data to substantiate this...."

Of course, the work of the 1950's and 1960's sharply altered the situation. However, at present among the specialists there reigns a feeling of dissatisfaction over the level of the geological exploration of Siberia, and this allows them to say that the process of understanding the natural complex of Siberia has scarcely gone beyond the initial stage.

Incidentally, judge for yourselves.

It is paradoxical but a fact that next to the standard refrain "relying on the exceptionally rich mineral and raw material base" as a rule, there is likely to be the standard Siberian statement "with the extremely slight geological exploration of the region...."

We had a talk on this question with the Academician-Secretary of the Geology Department of the USSR Academy of Sciences, B. S. Sokolov. I feel that the opinion of Boris Sergeyevich [Sokolov] would be of not a little interest to the readers of EKO.

B. S. Sokolov:

"The well-known victories of the geologists in Siberia related to the discovering of the oil and gas province have been accompanied by certain ancillary negative phenomena. In particular, confusion has arisen of the following sort. In Siberia the geologists have played their role and all that could be discovered has been discovered, and they have provided the state with raw materials beyond all expectation.... What a premature conclusion! The mineral wealth of Siberia has been studied several-fold less than in the European USSR and in the Urals.

"I should say that from the viewpoint of regional large-scale geological exploration the Soviet Union holds one of the last places among the developed countries. When this is said, everyone snorts mistrustingly wondering how this could be with our army of geologists and gigantic geological service. Nevertheless this is the case.

"Geological surveys differ in scale. During the years of the First Five-Year Plan, our nation lived through an age of so-called half million mapping (when 5 km were shown in 1 cm). This, of course, was not much better than a simple overall map, but for those times the success was enormous, and this is easy to understand if one recalls that by the year 1917 minute exploration had been carried out on the territory of our country. The USSR Minister of Geology at the conference has just informed us that over the last 10 years, geological exploration of Siberia on a scale of 1:200,000 has increased significantly. This means that a large portion of Siberian territory has now been mapped on a scale of one-two hundred thousandth (2 km per cm). Over the five-year plan, a little more remains to be mapped. But if one thinks about a serious study, then for all the promising regions it is essential to have in mind a scale of 1:25,000 and 1:50,000 (that is, 250 and 500 m per cm). Only such a scale makes it possible for us with sufficient geological soundness to move on to new structures which must be put into industrial exploitation. For carrying out this task we need in equal measure both exploratory drilling, detailed geological surveying and a detailed regional geological study of the nation. These processes should be carried out in parallel, hand in hand, otherwise the local forecast, that is, the forecast of any specific deposit, will constantly collide with the problem of lack of exploration.

"The proposals of geology should sharply anticipate the demand of the economy. And all our concerns should presently be linked with the forecasts. We must not think in categories of the current year or even the current five-year plan. This is particularly true for academy science. At present we must be thinking about what will happen in the 12th and the 15th five-year plans. Of course we will not be able to cover the entire gigantic territory of Siberia with 1:50,000 surveying (and I, it should be pointed out, perceive Siberia in the Lomonosov or Krashenninnikov manner, that is, Siberia is the entire territory from the Urals to the Pacific!). But it is essential to select vast pieces of this territory and on them carry out such precise surveying continuously. For in order to predict and seek out confidently and successfully it is essential to have a completely different geological study of the territory than the one which we presently have."

And what specifically do we have now? Here are data from the materials of the conference:

--The exploration, for example, of the Western Siberian Platform Depression comprises 70 cm of drilling per km², and this is judged by geologists as "exceptionally poor";

--Planned exploratory drilling work on the Siberian Platform is just commencing;

--For coal, with all of the magnificent estimates, it turns out that the Irkutsk Basin is the most studied. The Kansk-Achinsk Basin has been studied 2-fold less, the Minusinsk almost 4-fold less and the Kuznetsk Basin more than 4-fold less than the Irkutsk. All the remainder have been explored very little and the degree of their exploration runs into fractions of a percent.

One could continue but probably there is no need.

The USSR Ministry of Geology in Siberia has 12 scientific institutes and the expenditures on the research conducted by them in the Tenth Five-Year Plan exceeded 70 million rubles. But the report of the minister emphasized the necessity of developing primarily those areas which will decisively influence the improving of the forecasts and the methods of exploration, prospecting and the geological-economic evaluation of the deposits.

The section on the problems of the study and integrated use of the mineral raw material resources of Siberia stated the insufficient development of science. Up to now the oil and gas producing industry of Western Siberia has not been provided with scientific institutions. And Eastern Siberia needs the creation of a Deep Drilling Institute in Irkutsk or Krasnoyarsk, because the problem of deep drilling is acute for the Siberian Platform and requires special research.

Everyone constantly complains of the imperfection of geophysical methods and equipment, pointing to the great lag in these areas behind the needs of scientific and technical progress.

Academician A. A. Trofimuk, in generalizing the intersection sessions on the subject "A Glance at the Immediate Future of Siberian Energy," particularly emphasized the dissatisfaction of the conference participants with the state of exploratory equipment.

"We are working with equipment and methods that are 20 years out of date...."

The conference emphasized also the need to improve the planning of geological prospecting. Here of great importance, in the opinion of the minister, is the elaboration of large-scale programs for exploration and prospecting encompassing major regions and significant segments of time. As an example of such a program, the minister named the "Comprehensive Program of Geological Prospecting for Oil and Gas on the Siberian Platform."

However, the scientists are disconcerted by the insufficient scale of the search for hydrocarbons in Eastern Siberia. In the 11th Five-Year Plan within the Siberian Platform we must discover--as the task has been posed--the largest deposits and commence their exploitation. Soviet science, stated Academician A. A. Trofimuk, presently has the methods for the reliable detection of oil and gas in the earth's crust and the development and use of these methods will accelerate and reduce the cost of preparing the reserves both in Western and Eastern Siberia. But an indispensable condition for success has been, is and remains the demand not to permit a drop in the amount of exploratory drilling.

An improvement in the entire geological prospecting process for the purpose of increasing its efficiency is one of the important tasks posed by the 25th Party Congress for the prospectors.

The economy demands that the geologists quickly and dependably provide the reserves. But the geologists also have a counterclaim on the economy, that is, the failure to claim the discovered wealth. It has been proven, tested and is no longer doubted that the effectiveness of tapping the Siberian resources to an enormous degree

depends upon the rate of developing the deposits. And we have excellent examples which confirm this. The growth of the Noril'sk mining and industrial region has been due to the effective development of the Talnakhskoye and Oktyabr'skoye copper and nickel ore deposits, to the exploitation of the Syrylakhskoye deposit in Yakutia, due to which antimony production in the nation sharply increased in a brief period of time.

At the same time many papers and speeches gave numerous examples of mothballed deposits of very valuable minerals such as lead, zinc, tin and rare metals, and so forth. Possibly, mothballing should be viewed as the farsightedness of a thrifty owner? No, in the opinion of the conference participants, enormous wealth has been left to "marinate" for decades and significant amounts were invested and are being invested in their exploration, but this money has not brought any return. Hence the owner has proven to be wasteful and not thrifty. Nonferrous metallurgy merited most complaints from the geologists. For years now there has been talk about the copper of Udokan, the lead and zinc of Gorevka, but the hour of their development is constantly being deferred and is deferred to an indefinite time. Ferrous metallurgy was also criticized. The president of the USSR Academy of Sciences drew the attention of the conference participants to the insufficiently high development rates for the extraction and output of alloying materials, particularly for micro-alloying. As a result of this the national economy has not obtained the required amount of steel with needed quality characteristics. In reporting on the work of the section on mineral and raw material resources, Academician V. A. Kuznetsov, in response to the above-given complaint, pointed out:

"Probably certain leaders of the ministries of ferrous and nonferrous metallurgy have developed a view of Siberia as a region poor in rare metals. The work of our section has clearly shown that such a view does not correspond to reality. We, on the contrary, are very rich in major deposits of rare metals, many of which have long been patiently waiting for their hour because there still is the erroneous notion that their development is not an urgent matter."

Yes, a deposit, of course, is nothing that is going to run away. But, having paid a good deal for it (and the conference constantly reiterated that minerals are not a gratis gift of nature), is it advisable to put off the day for obtaining an effect? And particularly with a need precisely for these raw materials. The economists and geologists say that the completion of the Molodezhnoye chrysotile-asbestos deposit to a significant degree would make up for the lack of textile and pipe grades of asbestos, the deposits of Irkutskaya Oblast and Buryatia could provide a significant portion of the nation's demand for rare metals, and so forth.

In the opinion of the conference participants, among the primary deposits for development should be (in addition to the projects of the fuel and energy complex) such ones as the Udokan copper deposit, the Gorevka, Ozeroye and Kholodnenskoye lead-zinc deposits, the Deputatskoye tin ore deposit, the Zhirekenskoye and Orekitkanskye molybdenum deposits, the Molodezhnoye chrysotile-asbestos deposit and the Savinskoye magnesite deposit. When they "go into operation," the nation will substantially increase the output of copper, lead, zinc, tin and so forth.

This task has assumed particular urgency in line with the high construction rate on the BAM. A portion of the designated deposits is within its zone. The railroad is being laid rapidly but major design and exploration work is not being carried out

on developing the natural riches in its zone. The great time gap between the completion of the railroad and the operation of the deposits means large losses.

Precisely the geologists were the first at the conference to raise the question of not only why are the deposits not being used but also how they are being used.

From the report of the USSR Minister of Geology Ye. A. Kozlovskiy:

"Of the greatest importance is the working out of new methods of processing, dressing and utilizing mineral raw materials as well as waste-free methods of recovering all the useful components, wastes and tailings as well as the enclosing rock removed from underground. At present the Ministry of Geology explores the deposits comprehensively, providing a full description of all the mineral components. The time has come for all the ministries to shift from operating according to the principle of 'raw material for the production method' which does not meet today's needs to the principle of 'production method for the raw material.' In operating many deposits great losses are permitted in the mineral wealth. Also disconcerting is the practice established at a number of deposits of the selective use of the richest ores...."

And again the question was raised of the oil recovery factor. At present, with ordinary methods, this is from 30 to 45 percent of the geological reserves. It has been estimated that with the use of modern methods (the use of surface-active substances, pumping in hot water and so forth) would make it possible to obtain up to 40 million tons of additional oil annually over the next decade in Western Siberia, and up to 80 million tons in the following one.

Why can we not learn to take a maximum from the ground while we often spend a maximum on reaching this wealth?

Academician A. P. Aleksandrov answers this question as follows:

"For a purely economic reason. The problem is that the use of substances which increase the recovery of oil from the pool such as surface-active substances, hot water, steam and gas was economically disadvantageous with a low price for oil. This path to complete oil recovery would have reduced the operating effectiveness of all the oil extracting enterprises. But now, when the price for a ton of oil has risen by double, it is possible and rational to widely use the tested methods. Alas, there is little experience in this area."

In many regards in Siberia there is little experience, but the lack of it should be compensated for by precise knowledge primarily of the properties of the natural complex as the state is wagering heavily on its possibilities. A well thought-out economic strategy for the development of the region can be based only on knowledge, and the effect of this region on the Soviet economy will grow steadily.

3. How to Choose the Priority?

The question of the economic development of Siberia is a question of the values and proportions in the development of this very important region of our country from the standpoint of the entire national economic complex of the Soviet Union. And this economic problem of Siberia's development

is largely due to the fact that in containing three-quarters of the fuel and energy resources of the nation and over 60 percent of the other mineral, timber and water resources, the Siberian regions at the same time possess just 12 percent of the productive capital out of the total volume of the entire nation and approximately 8 percent of the labor resources.

For this reason, the main problem is, with such limited human resources, with the restricted capacity of the construction organizations and the insufficient availability of equipment, to put the enormous natural resources of Siberia into the service of the motherland.

From the report of
Academician A. G. Aganbegyan

On the other hand, the natural resources which are enormous in scale and diversity, their high concentration, the favorable stratification conditions and high quality, and the availability of power resources and water; on the other, the limited labor resources, the underdevelopment of the infrastructure, particularly the road network, the greater construction costs, the unfavorable working conditions (in the North). On the one hand and on the other... It is essential to choose what is to be built and what is to be developed in order to obtain a maximum return from the investments. In other words, it is essential to define the most rational structure of the Siberian economy, and for this there must be a careful selection, a sort of weeding out of the sectors and types of production to which priority must be given.

The problem of a choice and priority is a polemical problem and polemics either in an overt or concealed form are driven by the search for better solutions and come down to a duel of ideas, calculations and proposals. In the polemical "Siberiad" what would be considered formed opinions are boldly attacked, seemingly irrefutable arguments are put in doubt, contradictory viewpoints are brought up for discussion and this is a natural process.

From the report of Academician N. N. Nekrasov:

"There is the well-held viewpoint that the cost of the Siberian power resources will rise in the future. This is backed up by the argument of increased costs for geological prospecting, by the lack of a second Samotlor [rich Siberian oil field], by the necessity of developing the more remote areas and by other arguments.

"But there are also cost-reducing factors. Many hundreds of millions of rubles have already been invested into Western Siberia, a new Tyumen'--Surgut--Urengoy railroad has been built, large pipeline transport has been created and is in operation, and new cities have been built. All of this is just beginning to bring a return. The strengthening of integrated economic development is a major reserve for reducing product costs."

It must be said that this provision which can boldly be called a management rule in the Eastern regions nevertheless requires a systematic repetition and explanation, because in practice "integration" is a quality which is strongly resisted. The infrastructure indispositions which have long become chronic show serious troubles in the economic mechanism which is poorly adapted to solving those problems which the development of Siberia poses for the state and society.

Let us take a look at some infrastructure problems. Certainly this is one of the most painful points in the eastern regions of the nation. We should begin this review from the question of roads, or more accurately, from the vivid and emotional speech at the conference by the RSFSR Minister of Roads A. A. Nikolayev.

From the speech of A. A. Nikolayev:

"A good road is not noticed when you travel over it, but a bad one is resigned to with fatal inevitability. But certainly there is not a single economic sector the development and effectiveness of which do not depend upon motor transport. The degree of motor vehicle use and the state of the road network serve as an important indicator for the economic potential and social progress of a nation.

"Particularly great is the role of motor transport in agriculture and in newly developed industrial regions.

"Handed down to us from our grandfathers is the folk wisdom that it is not the horse that leads but rather the road. No matter how many vehicles one produces, their number does not solve the problem of providing, for example, agricultural production with a continuously operating motor transport conveyor. And the old saw about the horse and the road is assuming a new, harsher content in our days as without good roads and bridges the motor vehicle is dead.

"Special research has shown that in roadless areas transport expenses make up 40-47 percent of agricultural product costs and often the delivery cost exceeds the receipts of the farm from the sale of the products. Up to 60 percent of the tractors are used in the interseason in the wasteful towing of motor vehicles. During the spring muddy season millions of tons of mineral fertilizers and liming materials accumulate at the railroad stations. Ten years ago at the stations of the RSFSR 1 million tons of fertilizers remained undelivered in the first quarter, that is, by the start of sowing, while in 1979 the figure was 3.5-3.7 million tons. A bad season!

"One should realize that each year the state invests many millions of rubles in road work, but these capital investments, like the production capacity for their use, are scattered over the ministries and departments, each of which solves its own particular problems little considering the general tasks of developing a unified base network of highways. For this reason truncated roads constantly occur, like branches cut off from the trunk of a tree and these are generally of production rather than general transport significance. There are more than enough examples of this in Siberia.

"We consider the very possibility of the appearance of not public but rather internal departmental roads to be a major miscalculation of the planning bodies.

"The USSR consumes hundreds of millions of tons of oil, but only 1.19 percent of this oil goes to the roads in the form of bitumen for the entire nation. We view this as a second major mistake of the Gosplan. Each year 6.5 million tons of light oil products are lost on roads without a bitumen surface, but we are unable to give the road itself even 2 million tons of bitumen. The situation must be rectified in the following five-year plan.

"We have been repeatedly convinced that with the building of a good road to a remote village or rayon life there begins again. The loss of young people is reduced, personnel is retained, the productiveness of crop raising and livestock raising grows, while labor productivity of the rural workers rises by an average of 15 percent with a decline in capital investments.

"In many instances the problem of roads is more acute than the problem of housing, land reclamation or much else. And no comment is needed about Siberia as how can we get by without roads there? I have listened to the deputy minister of nonferrous metallurgy describe the giant combines which are to be built in Siberia. And I asked him just how much money has been put in the estimate to build roads to your combines. He fell silent. Hence the combine would be built but there would be no accesses to it for delivering materials and food products...."

From other materials at the conference it can be added that the growth rate of roads in Siberia is lower than in the European regions of the country. As of now there is no multilane highway connecting the various regions of Siberia as well as Siberia with the Urals and the European USSR.

Generally speaking, the transport development factor of Siberia is extremely low: more than 4-fold less than the Republic average, 9-11-fold less than in the Central, Central Chernozem and Northern Caucasus regions.

The Siberian railroads are extremely overloaded. Their load factor significantly exceeds the RSFSR average. Beginning in 1961, the development of the Siberian railroad network more and more has lagged behind the growth of the traffic volume.

The picture is the same with river transport. The cargo turnover has grown more rapidly than the navigable riverways. And the equipping of the Siberian rivers with transport and port facilities is 2-4-fold less than the RSFSR average. And the Siberian river transport is far from fully meeting the demands of the growing economy.

Under these conditions, the experience of combating roadlessness gained by the Siberian oblasts is particularly precious. Let us turn to the experience of the Tyumen' workers. It is they who, to put it bluntly, have felt on their own hide what in fact is meant by the hackneyed assertion that the development of Siberia is the fight against space.

The General Director of the Urayneftegaz [Urals Oil and Gas] Association, Hero of Socialist Labor Aleksandr Nikolayevich Filimonov recalls:

"In July 1966, the now deceased minister of the oil industry Shashin held a conference in Surgut. It was a representative conference attended by coworkers from several scientific research institutes, the leaders of main administrations and deputy ministers. And then, just imagine, at this high-level meeting (now I cannot remember this without smiling, but at that time it was full seriousness) the questions were discussed of building...sea piers across our swamps. The idea was not to be criticized. And in order to build the pier you had to get into the swamp, and for this you still had to build a road, that is, build it in order to later put up the metal trestle.... It was even proposed that canals be dug as they had in Mexico or was it in Venezuela, I don't precisely recall.

"We then also made our proposal and said that there was a simple and reliable method, namely, the construction of cluster foundations made from local sandy-type ground. At the same conference this method was declared to be too expensive and they had even estimated 350,000 [rubles] per foundation. At that time we had not yet begun to build, but I had already made estimates, and it turned out that ground carried in by dump trucks from quarries, for example, 20 km away for a cluster of wells of six holes would cost approximately 150,000. But certainly not 350,000. Life later forced us to develop our deposit in precisely this manner, and at present there is no doubt that we found the correct method.

"Take the same famous Samotlor. The deposit, basically, is under water. And here if you would drill as they drill in Tataria, Bashkiria or Baku with separate wells, you would be stuck forever! And precisely here methods arose for building roads and new drilling techniques.

"Or another example, Urengoy. The very rich gas deposit in area is almost double the size of the famous Medvezh'ye. Precisely Urengoy should provide the basic increment in the output of natural gas in the nation for the coming 10 years. But here nature has been particularly perverse and has hidden trillions of cubic meters of gas in the most inconvenient place for man, in swampy tundra which does not even have navigable rivers. And Novyy Urengoy which is growing up in the polar tundra has been taken prisoner, it can be said, by the lack of roads. Here freight is basically delivered by water. From Tyumen', Labytnanga and Salekhard the barges travel the Ob', Ob'skaya and Tazovskaya gubas [bays] and the Pur to reach the piers of the supply administrations. The route is a long one and is only open 3 months out of the 12.

"The capacity of the Nadym--Urengoy railroad is too small in comparison with the requirements of the construction workers, gas producers and drillers.

"The fivers bring in only the most urgent cargo."

The young Nadym is in an analogous situation as was described by Anatoliy Alekseyev in his sketch (EKO, No 9, 1980). Here, the author wrote, on hot days the "Anteys" [cargo planes] land one after the other with emergency cargo, but last autumn potatoes were such emergency cargo.

Although a piece of the "dead road" has been rebuilt and this was the gas field artery for Medvezh'ye and Urengoy, the transport system remains the number-one question for the region of the leading gas producing base of the country.

A. N. Filimonov told how local dirt was laid at the foundation of the drilling rigs. In Ust'-Balyk this was still possible, but the farther to the north the more frequently sand and gravel must be transported 2,000-2,500 km. For this reason log roads are built beside the deposits along with improved roads.

How are the log roads made? A flooring of logs is put down over the swamp or water-logged ground and sand placed on top. But lumber must also be carried to the tundra. And we have already gained a certain understanding of how freight makes its way to the same Urengoy. For example, it was no accident that last year out of the planned 9,000 m³ [of logs] 9-fold less was delivered to the region of Novyy Urengoy with the road builders receiving just a thousand m³ of lumber and the remainder floating somewhere along the Ob', from Tobol'sk to Khanty-Mansiysk....

In 1980, as PRAVDA announced, around 2 million m³ of wood must be placed in the log foundations under the drilling rigs. For this over 10,000 hectares of good forest must be felled. And even for forested Siberia this is an impressive figure.

What is the way out?

It was found. Almost 5 years ago in building roads in Western Siberia a synthetic nonwoven material was employed. It is obtained from the waste products of artificial fiber, chemical and garment industry plants. The fabric is laid down on a peat cushion instead of the beams and is covered over. The road is in no way inferior to a log road. Moreover, it was also discovered that the synthetic foundation is also suitable for laying improved roads. In them it can successfully replace the gravel and sand foundation and the roadway of the sand and cement mix.

Such an approach sharply accelerated road construction and it significantly reduced the cost. A kilometer of such a road is 20,000 rubles cheaper than a kilometer of ordinary highway. Last year, 300,000 m² of such a roadway were laid on Tyumen' land.

But this is certainly not the end of the problem.

The idea proved to be an excellent one, but as yet industry has not set up extensive production of nonwoven synthetic materials. And now they could be quickly produced directly in Siberia, in Tomsk and Tobol'sk.

Synthetic roads are a clever and doubly effective way to combat the problem of roadlessness as the amount of freight which is needed for building the road itself is also reduced. The fabric replaces lumber, sand, gravel and so forth.

Now let us examine the problem from another side. Is all the freight which is transported or flown to the North indispensably necessary there?

This question seems absurd as who, with the excessive traffic on the existing roads and the absence of needed ones, would send unnecessary articles to the North?

But still, but still. What is transported over the Siberian roads, or even more often across country?

The production of oil and gas is ensured by extensive construction. The construction workers are well aware that the most complicated installations are the ground facilities of the gas fields, the pumping and compressor stations. And although the amount of this work does not exceed 25-30 percent of the cost, precisely it determines the carrying out of the basic processes related to the extraction, preparation and transportation of oil and gas.

Some of these projects are plants costing tens of millions of rubles with complicated production subsystems and utility and service facilities.

How can they be built in areas where one brick costs a ruble because it must be brought in nearly all the way by air?

The Tyumen' workers began traditionally, that is, to put it frankly, thus: a foundation, walls from brick or panels, the delivery of equipment, assembly, the underground networks and so forth. With such a method of construction, a boiler room according to the standards would take 15-18 months. From the very first steps it was clear that this path was unacceptable for Tyumen' conditions.

Thus the idea arose among the Tyumen' workers to "build at the plant," that is, to manufacture the units under stationary conditions with the necessary "stuffing" and to ship to the north not components but rather a complete "pie." The pioneers of the complete-modular method of construction appeared in 1967 and owe their birth to the young enthusiasts from the Tyumengazmontazh [Tyumen' Gas Installation] Trust. (EKO in issue No 7, 1979, told in detail about the method and its developers were awarded the Lenin Prize in 1980).

And now in Tyumen' there is a large association in operation which is carrying out the idea of building from highly prefabricated elements. This is Sibkomplektmontazh [Siberian Association for the Assembly of Prefabricated Elements]; it consists of a group of plants and assembly and installation enterprises.

For the all-Union conference two joint issues were prepared of EKO and the weekly of the Presidium of the Siberian Division of the USSR Academy of Sciences ZA NAUKI I SIBIRI. One of them published a talk with the USSR first deputy minister for the construction of enterprises of the oil and gas industry, the leader of work in developing and introducing the new method and winner of the State Prize, Yu. P. Batalin. Here is a fragment from this talk.

Yu. P. Batalin:

"The idea of modular construction was born gradually. We began by shifting various operations from the construction sites to the plants. The streams of resources were made up in the form of so-called boxcar modules which corresponded to the railroad dimensions. At the plants inside such modules equipment was installed completely and at the construction site it was merely a question of placing such a module on a light foundation, connecting it to the external utilities and it was ready to use. But because of the large sizes not all of the equipment could be included in the single modules. Moreover, their use greatly lengthened the utility lines, and particularly for such scarce items as cable and wire. For this reason, in the next stage we arrived at the technical solution of making up boxcar modules like honeycombs: just as one cell is fastened to another cell, so a module is abutted to another module. The honeycomb layout was used above the utility floor and as a result of this utility expenditures were sharply reduced.

"The heavy-weight consolidated modules were the next generation. Using a floating foundation, each supermodule, as they are sometimes called, included the entire prefabricated object. For example, the cluster pumping stations used to inject water into the pool weighing 214 tons; 300-ton booster pumping stations to move oil and a number of other facilities which were towed over water to the assembly area. In truth, we still have not created a reliable system for transporting such heavy freight over land, but the experience of movements over a distance of 3-5 km has already been mastered, and in individual instances up to 15 km.

"The Tyumen' enterprises have already built more than a score such supermodules and they have been installed in the Ob' areas at the oil fields. Thus, an industrial construction conveyor has been developed and is working."

The broad realization of the above-mentioned ideas such as roads based on synthetic materials and modular units certainly has sharply altered the structure of freight flows into the pioneer development areas. This, of course, does not mean that roads cannot be built or fewer are to be built, but it does mean that it is essential to give up certain old notions and realize that only scientific and technical progress can suggest the fundamental solutions. And not only in construction. Below we will return to other aspects of the subject of "what we transport over Siberian roads and why," but now let us stay with construction, the construction complex of Siberia the preferential development of which seemingly would be among the indisputed ideas.

The Second Secretary of the Altayskiy Kraykom Viktor Timofeyevich Mishchenko spoke strongly and sharply about this. He began by stating that in the opinion of the Altay workers, two major problems determine the successful development of Siberia. These are: the more rapid development rate of construction and construction facilities, and the solving of social problems.

From the statement of V. T. Mishchenko:

"Due to the lag in construction during the Ninth Five-Year Plan, the capital investments of the state and cooperative organizations on a per capita basis were 80 percent lower in Altayskiy Kray than the republic level and 63 percent lower than the level of Western Siberia.

"At present the construction volumes are determined not by the needs of the economy but rather by the capabilities of the construction workers. Thus, at the beginning of the Tenth Five-Year Plan we estimated how much in capital investments the kray would use over the 5 years. But the construction workers said that they could use 60 million rubles less. What was the result of this? We could not develop the planned capacity for machine building and in 1 year alone the state failed to receive 7,000 tractors and other products.

"Cardinal measures must be taken to improve the organization of construction. Progressive structural elements and modules are fine, but basic order must first be organized in construction. Hired brigades are employed in the Altay and these are called "wild brigades" where the workers earn 500-600 rubles a month. And now, sometimes candidates of science work in these brigades. Why? Because such a brigade guarantees both order and earnings, posing for the client the rigid demand that during the time of construction the site should have everything, reinforced concrete, brick and so forth. The advantage of a rigid, dry law. But such elementary order is essential at any construction site."

You will agree that it is a shameful situation when from the rostrum of a national conference one of the leaders of the kray uses as an example for large construction trusts the organization of labor in a "wild" brigade of roustabouts!

At the conference we repeatedly saw that the volumes of construction and installation work do not correspond to the development level of the building materials

industry. In one of the reports from the section of capital construction problems in the Siberian regions, the following data were given: while over the last 3 years the volume of construction-installation work in Siberia has increased by 20 percent, in cement production the rise has been only 3.5 percent, for prefabricated reinforced concrete by 12 percent, for wall materials by 9 percent and for inert building materials by 15 percent. Even assuming the more economic consumption of building materials, it is impossible to explain such a gap in the development of the construction facilities and the planned amounts of construction just by this. The facilities lag behind and greatly. A particularly great shortage of building materials is felt at the construction sites of Tyumenskaya Oblast where each year they ship in chiefly from the Urals 1.5 million m³ of prefabricated reinforced concrete, 120 million pieces of brick, and 5-6 million m³ of inert building materials.

Regardless of the shortage of building materials, certain ministries are reducing their production. And if one examines the corresponding data, it turns out that this is not an accident and the trend of recent years is more than explainable and that the complaints of the lack of building materials are becoming ever greater.

The enterprises in the construction industry base are located unevenly over Siberia. Irkutskaya, Kemerovskaya and Novosibirskaya Oblasts as well as the south of Krasnoyarskiy Kray produce 93 percent of the cement, 50 percent of the construction brick, 60 percent of the prefabricated reinforced concrete and mine 62 percent of the inert building materials. It has happened that the enterprises which produce building materials and elements are located in the southern regions of Siberia, along the Transsiberian mainline, and are basically concentrated in the kray and oblast centers.

And superimposed on these unfavorable circumstances is the departmental atomization of the construction complex. On the territory of the Western Siberian oil and gas province construction is carried out by 26 ministries and departments, and in the Angara-Yenisey region by 15. All in all, in Siberia, in addition to the USSR Ministry of Building Materials, the USSR Ministry of Construction and the USSR Ministry of Industrial Construction, around 30 ministries and departments of the nation and the republic are engaged in construction and the production of building materials. Their actions are poorly coordinated.

In particular, the following example was given. On the territory of the Angara-Yenisey region the Ministry of Lumber and Woodworking Industry produces around 5 million m³ of lumber for export and for delivery to the unforested regions of the nation, but at the same time does not satisfy the needs of the region's construction organizations for woodworking products. The construction workers are forced to set up their own lumber sawing and woodworking enterprises, the efficiency of which, of course, is low.

From the report of the Deputy Chairman of the USSR Gosstroy I. I. Ishchenko:

"In Siberia it is essential first of all to create a balanced construction complex which is ahead of the development of the other sectors.

"One can see to what delays in the development of construction facilities lead to from many examples, including the shortcomings of housing construction in

Tyumenskaya Oblast. Here the capacity of plant housing construction is increasing extremely slowly. As a result many fewer houses are being built than were planned, the parts for them must be shipped in literally from all corners of the nation, and this costs the state a great deal.

"Of particular significance for Siberian conditions is the carrying out of construction on the highest organizational and technical level which will bring about a reduction in the overall expenditure of material resources, a significant reduction of labor intensiveness and construction costs and a shortening of the construction time.

"Siberia has experience in such construction. This experience is being successfully employed now, for example, in the construction of the Krasnoyarsk heavy excavator plant."

Of course, when the panels for Severo-Baykal'sk are shipped from Leningrad, brick for Neryungri comes from Yaktusk, and iron reinforcing for the bridges of the BAM from somewhere in the Ukraine, there is no shortage of freight for the railroads, and could scarcely be foreseen if the output of Siberian building materials is further reduced....

Incidentally, let us break off this peevish stipulation quickly and turn to the experience of the Krasnoyarsk workers which has recently been more and more in the news.

Let us talk with the chief of the Krasnoyarskstroy [Krasnoyarsk Construction] Glavk [main administration or trust], Vladimir Petrovich Abovskiy. The glavk carries out industrial and housing construction over a widespread territory, both in the southern regions of the kray as well as in the regions of the Middle Yenisey. The list of its projects includes the Sayan territorial-production complex, the Krasnoyarsk and Achinsk industrial areas, the development of the rayons of Lesosibirsk and others where in recent years large enterprises of nonferrous metallurgy, machine building, woodworking and chemistry have been built and put into operation.

V. P. Abovskiy:

"It is important that all the presently listed construction be carried out by industrial methods, on an integrated basis, carrying out not only the production but also the housing and service program. During the years of the Ninth and Tenth five-year plans, the amount of work carried out by our glavk rose by almost 3.5-fold in comparison with the Seventh-Eighth five-year plans. This was possible only due to the creation of modern production facilities and to their constant improvement. Our facilities are capable of carrying out the program of the 11th Five-Year Plan considering the reserves which will come about from the opening up of new production capacity and developing new efficient structural elements. It should be pointed out that our facilities have been designed, built and are continuously being improved under the daily guidance of the Krasnoyarsk Promstroyniiprojekt [Scientific Research and Design Institute for Industrial Construction] which constantly is searching for and implementing better plans. At present, 88 percent of the construction carried out by the main administration is large-panel. More than 60 percent of the housing produced is new series housing which meets the plans for 1981-1985 according to the requirements of the Construction Standards and Rules.

"We have been able to organize the construction of schools, children's institutions and other cultural and service facilities using complete prefabrication. This also has noticeably reduced times and expenditures. We have created a special subunit which is concerned with the development of the kray center of Krasnoyarsk. Each year it completes two-three large projects which are noticeable in the overall architectural appearance of the city. There are similar subdivisions in Abakan and Achinsk.

"We have been given high construction rates. The Krasnoyarsk heavy excavator plant should be built 1.7-fold faster than envisaged by the standards. This is possible only in converting from construction out of linear elements to the construction out of production modules. We have created the facilities for such a transition. Already at work is the Krasnoyarsk Experimental Plant Construction Combine No 1 and this is production for fully complete deliveries with a volume of 200,000 m² of industrial projects. The combine not only produces the "cubes," but also itself assembles the building from them, from the basement up to the keys. The elements from which the modules are assembled do not require any additional work, even welding. The building is "screwed together" like a child's erector set. We have already built one enterprise in this method, the combine for industrial construction elements. At this project in one day we installed 1,000 m² of roofing. The same conveyor-module method is presently being used in building the heavy excavator plant.

"I should point out that the combine for industrial structural elements built out of modules is itself a new type of enterprise, the first such plant in Siberia. It produces the parts for a one-story house with an area of 60 m² and this house can be assembled by six persons in two shifts. The combine produces buildings for children's institutions, public centers, in a word, all the parts from which within a month it is possible to assemble a completely equipped settlement for 1,000 persons. It began producing its first products last year. What else is important? The structural elements produced by the combine are easily transported. Thus it is possible to eliminate the pressure in the housing, sociocultural and service area of which many rayons of Siberia complain. We also see the way for developing the construction complex in this as well, that is, in the industrialization of construction itself. We do have major complaints about the designers. The present designing is not oriented toward a labor-saving policy and the entire Siberian economy should develop under this flag. The aims of our designers are not coordinated and the quality of the designs, as a rule, requires great additional work.

"In construction, as in industry, design-production associations are needed, and this must be done immediately. The step ahead will be a noticeable one! Unfortunately, the USSR Gosstroy does not share this viewpoint. But there have not been many real proposals to bring the Siberian construction complex up to the level of modern requirements...."

The Gosstroy report heard at the conference was basically focused on the questions of employing new structural elements and new construction methods. Here, in particular, it was stated that for supplying the Siberian construction projects with light complete metal structural elements, during the 11th Five-Year Plan in Krasnoyarskiy Kray it would be advisable to create additional capacity for producing 1.2 million m² of enclosing elements out of sheet metal, and to develop the production of sheet materials based on asbestos cement and wood as well as efficient insulation.

The Gostroy institutes have worked out a scheme for the development of the production construction facilities up to the year 1990, and with a more detailed feasibility study for the period of 1981-1985 for all the oblasts, krais and autonomous republics. Here a whole series of new structural elements and products are to be used.

All of this is well and good, but, as V. T. Mishchenko said, the question is not merely one of structural elements, but rather an "elementary order" which, naturally, involves measures in the area of improving management.

But let us return to one of the recurrent questions in this chapter of what is transported over the Siberian roads.

From the report of Academician N. N. Nekrasov:

"The new large enterprises of the manufacturing industry are being built very slowly in Siberia. The very energy- and fuel-intensive chemical enterprises and the ferrous metallurgy plants are built much more energetically in the European regions than in Siberia. The proportional amount of Siberian chemistry in national production has noticeably declined. Regardless of the rapid rise in the demand of Siberia for ferrous metals, their production is growing slowly. The Tayshet Ferrous Metallurgical Plant is not only not being built but is not even being designed. The plant for high-grade electrometallurgy intended for the past five-year plan in the Sayans has not been built. All of this has caused an excessive load of fuel freight in the east-west traffic and metal and equipment in the west-east traffic."

From the report of Academician A. G. Aganbegyan:

"In order to achieve the greatest national economic effect in Siberia, it is essential to accelerate the completeness of processing raw materials in Western Siberia. The Western Siberian Metallurgical Plant, regardless of the presence of enormous reserves of iron ores in Siberia, each year ships 1 million tons of pellets in from Kurskaya Oblast; it produces rolled product and sells 1.4 million tons of steel ingots which are shipped out of Siberia. What is the purpose of all these movements? To ship raw materials into Siberia for processing when Siberia is rich in raw materials and to ship out finished products to the developed regions--can one speak of any optimality here?"

The demand to increase the completeness of raw materials processing applies to petroleum, nonferrous metals and to lumber. Up to the present, logs and sawn lumber are predominantly shipped out of Siberia with the burning of all the other lumbering wastes which could be used to create hydrolysis production. In Siberia the greatest effect could come from the development of modern chemistry, since here there are both the raw materials, the water and the energy. At the same time, Siberia produces 12 percent of the national production of resins, plastics and chemical fibers and only 2 percent of the mineral fertilizers. And the Siberian fields receive 6-fold less fertilizer per hectare than the national average.

The section of the lumber industry complex headed by Corresponding Member of the USSR Academy of Sciences A. S. Isayev stated that until recently in Siberia there had not been the necessary development of the woodworking and pulp-paper industry. The lumber industry complexes were being slowly created and while they were being

created their raw material supplies were being improperly used and this has led to their premature depletion. And this also has given rise to the problem of supplying raw materials for the existing lumber industry complexes such as the Ust'-Ilimsk, Bratsk, Krasnoyarsk and others. The section recommended that provision be made for the more rapid development rate of the lumber industry complex in the areas of Siberia and primarily enterprises for the chemical and chemical-mechanical processing of wood.

"More rapid rates" for the transport system. "More rapid rates" for the construction complex. "More rapid rates" for the processing sectors...

But how should the priorities be chosen?

Calculations employing mathematical models put in our hands a sufficiently precise instrument to determine what development rates in the eastern regions will bring the greatest effect for the entire nation. With the use of the same models, proportions have been determined between the sectors, the ties of major types of production over time, and the effectiveness of their return. Hence the question of priorities in our times can be settled not on the basis of listening to the voices of the sectors, "loud" or "soft" voices depending upon many circumstances, but exclusively on a basis of model calculations for the comparative national economic effectiveness from the development of various aspects of the Siberian economy. And if we know (if we have estimated) that the mining of each ton of conditional fuel units from the Siberian earth will save the state 3-4 rubles in capital and current expenditures in the event that this fuel is transported to the European USSR; but if it is consumed on the spot then the savings is double the amount--if this is known and proven--here is our answer to the question of priorities.

But priorities disclosed by calculation are still not guidelines for practice, for practice acts as is more advantageous for it now, at the present. And in order to orient practice to the long run, priority conditions must be created for the priority areas of economic development. But this is now a question of management, of the economic mechanism.

4. How to Maintain Priorities

Industrial Siberia already in terms of a number of factors now possesses better conditions for new construction. Here there is cheap fuel, abundant industrial raw materials, particularly for chemical production, and in a number of areas cheaper building materials, particularly cement, in comparison with the central regions. The new electric power rates to be introduced in 1982 provide that, for example, in Krasnoyarsk and Bratsk the rates will be half the amount in comparison with the central regions. For Siberia it is very advisable to work out and introduce a series of scientifically sound economic measures which would actively contribute to the lowering of energy- and water-intensive production here and would accelerate the creation of a new economic structure for Siberia's economy which not fully reflects the effectiveness of employing the natural resources of this region.

From the report of
Academician N. N. Nekrasov

Preferential development requires preferential financing and in the conference materials noting the insufficient development of one or another economic sphere the priority significance of which could be considered generally accepted there was the constant emphasis that the shortcomings...are the consequence of investment policy which does not meet the demands of the efficient development of Siberia's productive forces.

Let us turn to the report by the director of the TsENII of the RSFSR Gosplan, Corresponding Member of the VASKhNIL V. P. Moshin and quote from it a rather extensive excerpt so that the readers gain a notion of not only the idea but also the system of arguments in its favor.

V. P. Moshin:

"The tasks of developing Siberia's productive forces require better utilization of the entire economic planning mechanism.

"There is a number of factors which increase the cost of processing natural resources in Siberia. They operate both at the stage of building the projects, particularly in inaccessible new-development areas, as well as in the operational stage due to the increased expenditures on creating an infrastructure and for wages. This circumstance has had a noticeable impact on the territorial distribution of resources, forcing the ministries and departments to hold up the growth rate of individual types of production in this area, particularly now, when each ministry is endeavoring to keep within the allocated limits and provide cost accounting principles in its operations.

"In order to eliminate the discrepancy between the planning tasks and the economic interests of the individual departments vis-a-vis Siberia, it is essential to make more correct use of the existing economic levers and incentives. The economic indicators should reflect not only the cost-increasing factors but also those economic advantages which undoubtedly Siberia possesses, including: cheap fuel, the presence of free water and land resources for new construction. As yet these advantages economically are not being realized or are not being sufficiently realized.

"It is a question primarily of the prices for the raw materials extracted and used directly in Siberia. For example, it is generally recognized that petrochemical development is among the specialization sectors of Siberia. At the same time, the price for hydrocarbon raw materials for the petrochemical production in Siberia is higher than in the Volga Region. Thus, the price for directly distilled benzene, a feedstock for the production of ethylene and propylene for the Siberian consumer enterprises, is equal to 18 rubles per ton, but in the Volga Region it is 13.5 rubles.

"The ex-factory prices for coal in Western Siberia are only 5 percent less than the sectorial average, and for gas they are 1 percent higher. And this occurs under the condition where the average cost of coal in Siberia (according to 1978 data) is 36 percent lower than the sectorial average, and for natural gas in Western Siberia more than 10 percent lower.

"The solution lies in providing preference for the Siberian enterprises which make intense use of the natural resources by a more profound territorial differentiation

of the prices for raw materials and fuel based on objective production conditions. In this manner it is possible to economically interest the corresponding ministries in moving to the eastern regions. This circumstance should be taken into account in the coming wholesale price revision.

"The experience of the aluminum industry's development shows the effectiveness of the proposed path. The ex-factory price for electric power in Eastern Siberia is 60 percent below the sectorial average, and this contributed greatly to the rise of the major aluminum-producing center precisely here.

"The system of economic protectionism in terms of a number of sectors can include other methods in addition to prices.

"Thus, the Decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 for strengthening the economic incentive of the ministries, associations and enterprises to make most efficient use of material and financial resources provided for the establishing for the ministries (as they were ready for this) a stable profit deduction rate which could be used by them for financing capital investments, for forming a unified fund for science and technology, economic incentive funds and for other planned expenditures to develop the sector.

"We feel that in introducing a normed procedure for profit distribution the associations and enterprises located in the Siberian regions should be put in a preferential position, leaving available to them a more significant portion of both the planned and above-plan profit. The prospect of obtaining additional financial resources for expanding production facilities and improving the sociocultural conditions for the workers would increase the interest of the ministries, associations and departments in developing their production in Siberia.

"We must have a new assessment of the existing view on the inevitable increased costs of pioneer construction in the Eastern Regions and for the assertion that the capital intensiveness of construction in Siberia is higher than, for example, in the central part of the RSFSR. Analysis shows that this indicator in the regions of Western Siberia is 0.18 percent lower than the average level for the RSFSR. In Eastern Siberia it is somewhat higher than this average level but lower than in a number of oblasts of the Center or, for example, in Turkmenia.

"And what about the situation with building materials? The cost, for example, of a ton of cement in Siberia in 1978 was only 1.8 percent higher than the republic average. And if one turns to individual examples, it turns out that the cement production costs at the Krasnoyarsk Cement Plant are 20-25 percent lower than at the Podol'sk plant in the greater Moscow area. The cost of prefabricated reinforced concrete in Novosibirskaya Oblast is lower than in many central oblasts such as Kaluzhskaya, Kalininskaya or Astrakhanskaya. A complete realization of the advantages of progressive construction methods in Siberia and a rise in labor productivity would more sharply tilt the view of comparative construction costs in Siberia's favor.

"The fee for the use of natural resources can and should become an important instrument in the economic methods to rationally locate the productive forces.

"As an example let us turn to the use of such a resource as water. The European regions of the RSFSR have 23 percent of the republic's water supplies, but more than 80 percent is consumed here. In terms of the available water resources (calculated per inhabitant) the Central and Northern Caucasus economic regions, for example, are 13-fold behind Western Siberia and 40-fold behind Eastern Siberia. However in the cost of construction projects and in calculating current expenditures, these regional differences are not appropriately shown. If the plans and fees for water employed these indicators, it is not difficult to imagine how Siberia would gain in comparing the effectiveness of locating water-intensive production. The same can be said about the assessment of land plots allocated for new construction.

"It is essential to emphasize that the Decree of the CPSU Central Committee and the USSR Council of Ministers 'On Improving Planning and Strengthening the Effect of the Economic Mechanism on Raising Production Efficiency and Work Quality' opens up new opportunities for using economic planning methods for the purposes of the accelerated development of Siberia's productive forces. Thus, the decree envisages the introduction of a fee for water taken out of the water management systems by the industrial enterprises and requires an economic evaluation of the land plots to be allocated for industrial construction in the feasibility studies for the construction of enterprises and in comparing the economy of the different variations.

"Of course, the importance of the designated decree for the accelerated development of the natural riches of Siberia is not restricted to this. An important role should be played by the specific regional programs, including those for the TPK [territorial production complex], and by the approving of basic indicators for the economic and social development for each complex, regardless of the departmental affiliation of the associations and enterprises. This will ensure a better combination of sectorial and territorial development and the establishing of concentrated construction areas in the contracting plans. At present the ministries in the draft plans are required to isolate the indicators for the development of departmental enterprises which are part of the TPK of Siberia and the Far East.

"I would like to draw attention to two other provisions from this decree. The first concerns a gradual transition in the sectors to building enterprises on credit provided to the contracting construction and installation organizations. The granting of such credit on easier terms could be one of the measures to encourage construction in Siberia.

"The second provision concerns the existing system for the planning and financing of housing and sociocultural construction. Here a large portion of the state allocations for these purposes is distributed not to the local soviets but to the numerous ministries and departments. This leads to the well-known consequences of the scattering of funds for the development of the nonproduction sphere, to incomplete development and so forth. The drawbacks of such a system are felt particularly strongly in new development areas where planned expenditures must be made on the social infrastructure. To put it mildly, the ministries make no effort to allocate and use the funds for these purposes. A disproportion arises between the production and nonproduction spheres.

"In our opinion, we must gradually shift all allocations for housing and sociocultural construction to the republic and local soviets expanding their production facilities in doing this."

This is the line of argument taken by specialists on the question of a certain re-allocation of capital investments in favor of more intensive development of Siberia's productive forces.

"Economics is a science concerned with overcoming contradictions. Where there are no contradictions, there is nothing for an economist to do...." These words were said by Doctor of Economic Sciences B. S. Vaynshteyn, and if one believes the aphorism said half in jest, then it could be said that Siberia is one of the most attractive places for an industrious economist because there are more than enough contradictions in its development!

B. S. Vaynshteyn himself who has studied the questions of the development of the economic mechanism in capital construction, in his work has isolated what in his opinion are two key contradictions:

- 1) Between the objectives which set the content of capital construction plans and the real resources which are allocated for the achieving of these objectives;
- 2) Between the rapid growth of the productive forces and the profound inertia of economic relations between all the participants in the investment process in construction.

We spoke with B. S. Vaynshteyn:

"What is happening at the construction sites of Siberia? The carrying out of the plans for the volume of construction-installation work over four five-year plans year after year has remained on a level of 97-105 percent. The carrying out of the plan for completing projects has almost never risen above 85 percent. For any industrial ministry the fulfillment of a production plan even by 97 percent would be a catastrophe! But the construction workers throughout Siberia achieve only 75-80 percent of their main indicator, the completion of the projects. Incidentally, 80-85 percent is already considered excellent, and this is far from always achieved....

"Why? There are many reasons including: the imbalance of the capital construction plans, the scattering of resources, the increase in incomplete construction and the replacing of the basic specific plan indicator--the completion of the project--by an expenditure indicator, the gross volume of construction-installation work in monetary terms. During the Ninth Five-Year Plan, the plan for the completion of production capacity for the Siberian regions was not coordinated with the capital construction plan, with the amount of construction-installation work and with the material resources.

"The Tenth Five-Year Plan has not broken these negative trends. A new stage in improving capital construction was marked by the Decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979. Here the principle of forming economic relations between all participants in the investment process according to the completed construction product was put in the forefront. A significant limitation has been put on the sphere of use of the 'gross' which is termed the 'volume of contracting.' It cannot be an evaluation indicator nor a basis for profit formation. The amounts of construction-installation work carried out are not paid for by the bank but are merely credited for the period until the completed project is

in operation, after which the credit is retired from the amounts obtained from the client for the finished product.

"An opportunity has also been envisaged for employing the 'net product' indicator for planning labor productivity and the wage fund. This fundamentally alters the attitude of the contracting organizations toward the 'advantageous' (expensive) jobs and eliminates the incentives to carry them out. 'Turnkey' construction has been recognized as advisable with the turning over of fully completed projects ready to function to the clients.

"Both the listed as well as other measures provided for in the decree of 12 July 1979 should alter a great deal in construction practices generally and in Siberia in particular. It is essential to decisively utilize the new opportunities which are opening up in the course of improving the economic mechanism."

In following the emphases placed by a majority of the conference participants, we have drawn the attention of our readers to Siberia primarily as a source of natural resources, particularly fuel and energy ones. Incidentally, within the limits of this approach we have not taken up many problems. For example, such a major one as the development of the BAM zone. But the problems of the BAM have been taken up in several special issues of EKO and so the readers are familiar with this group of questions.

However, behind the entire interlacing of problems related to putting the new raw material sources on Siberian territory into economic circulation there inevitably stands man who must be attracted to Siberia, and also housed, fed and served somewhere. In turning to this aspect of the question, the conference participants carefully examined a multiplicity of interrelated problems. And one of the first ones was the development of the agroindustrial complex.

Much was said about the agroindustrial complex at the conference, and the range of questions discussed around this subject was extremely broad. They ran from the possibilities of the raw materials to produce mineral fertilizers in Siberia to the biological problems of obtaining new productive varieties of agricultural crops and animal breeds, from calculating the losses caused by the lack of roads to estimating profit from irrigation, and so forth.

"Agricultural production," said L. I. Brezhnev at the November (1979) Plenum of the CPSU Central Committee, "cannot be viewed in isolation from the system of procurements, transport, storage, processing and trade of food products. All of this is a single food complex. And it should be planned as an integrated whole."

And precisely this was the approach of the conference participants.

V. R. Boyev, director of the Institute for Agricultural Economics of the Siberian Division of the VASKhNIL and Corresponding Member of the VASKhNIL:

"In many regions of Siberia the public's demand for meat, milk, poultry products, vegetables and fruits is still not fully satisfied. The lag is explainable by many factors, but the prime one is the slow rise in the production facilities of the kolkhozes and sovkhoses and the interfarm associations and the disrupting of proportionality in the development of the basic elements of the agrofood complexes within which the integration of agriculture with industry is carried out.

"In recent years, even with the relatively low growth rates for the gross crop and livestock products, there has been a noticeable lag among the sectors which supply agriculture with the means of production and particularly the sectors which carry out the procurement, transporting, storage, partial or complete processing and sale of the products. This leads to many additional material and labor expenditures, including for transporting the products. Thus, in 1978, due to the poor development of intersectorial ties in the agroindustrial complex of Western Siberia around four million tons of various agricultural freight were irrationally moved by rail.

"The planning shortcomings lead to disruptions in the optimum ratios between the operating and towed equipment, between the availability and need for feed, spare parts, production or cultural-service facilities and so forth.

"A characteristic example is the use of the high-powered T-150 and K-701 tractors. For their full utilization it is essential to have a range of 76 towed and mounted machines and implements, but in 1979 industry did not produce one-half of the required assortment. The incomplete delivery of machines, the lack of good conditions for the maintenance and overhaul of equipment, the insufficient reliability of this equipment and the nonobservance of operating standards--all of this has led to a decline in the normed service lives of many machines and mechanisms. For this reason a significant portion of the equipment received by agriculture goes not to increase the level of mechanization but rather to replace prematurely withdrawn means of production.

"We must have a range of coordinated measures to improve the economic mechanism for the functioning of all elements of the agroindustrial complex and the consistent introduction of specific program planning which would orient the development of the complex toward greater output of end product based upon production intensification."

As we can see, the position of an agricultural specialist in many regards echoes the comments quoted previously in this report.

What is better: to increase the production of machinery without being concerned with the roads which--in retribution for the lack of attention--will instantly absorb the entire increase in equipment, or give preference to road construction, possibly even having slightly checked the output of some machines, regardless of the swollen "order portfolio"?

What is more advantageous--to organize fertilizer production without being concerned with the throughput capacity of the existing railroad lines and the capacity of the existing storage facilities, or initially create a sound transport and storage base and then begin new production?

What is more reasonable--to produce 500 high-powered tractors and all the implements needed for them or to save on the mounted implements for the sake of a hundred extra machines which later on will be used for primitive transporting and not for the cultivating of plowed lands?

The problem of choice is an economic problem. Here it is essential to calculate, to compare and only then plan. But the solution to many social problems depends directly upon economic choice, and the acuteness of these problems, in the opinion of the conference participants, is a consequence of precisely the economic failings and hitches in the economic mechanism.

In summing up the work of a joint session of several sections which discussed the subject "Man--The Economy--The Environment," Academician A. G. Aganbegyan said:

"Undoubtedly the 'human problem' in Siberia is the main problem today. When I speak with economic leaders, I usually begin with the question of what are you most concerned with and what bothers you the most? Previously the answer was basically: material and technical supply; from early morning I am on the phone trying to get preassembled parts, spare parts and so forth. At present any leader would answer us that the personnel problem is most on his mind and this is the main problem at any Siberian enterprise. Production efficiency depends upon the solving of it. In recent years noticeable changes have occurred in the migration flow. Previously Siberia lost more than 70,000 persons a year, and now each year significantly more workers arrive in the Siberian regions than leave them. Of course, this process has not involved all the regions of Siberia, but as a whole this is the trend. And this shift has occurred not spontaneously but because serious measures have been taken. Let me recall precisely what ones. Over the last decade the regional coefficients in Siberia have been extended to all the sectors, while previously only 60 percent of the enterprises had them. Furthermore, entire regions have received an increased coefficient and the territories of the oil and gas complex have been made equal in advantages to the Far North, and here a maximum coefficient of 1.7 has been set. The basic construction detachments of the BAM have also been given benefits. Quite recently the coefficient was increased for coal workers and construction workers of the Kuznetsk Basin to 1.25 rather than the previous 1.15. Many other various measures have been carried out to systematize the benefit system for Siberians. Calculations show that housing construction has increased noticeably in Siberia. The amount of this construction over the last decade is incomparable with what was built previously. But, of course, from the viewpoint of demand, particularly long-range, we must do significantly more than what was done."

5. Our Home--Siberia

Under present-day conditions, a ruble invested to improve housing and develop public services is capable of bringing a greater return than a ruble invested into the further strengthening of the material and technical base without consideration of the living conditions of the workers.

From the report of Corresponding Member of the
USSR Academy of Sciences T. I. Zaslavskaya

The social processes in Siberia represent a complicated and interesting object of research for sociologists. At the same time that Siberia's contribution to the national economy has constantly risen, its share of the Soviet population, beginning in the 1960's, has gradually declined. Here are the statistical data:

	1939	1959	1970	1979
Share of Siberia in nation's population, %	7.1	8.5	8.1	8.0

The population density in the eastern regions is scores of times lower than in the European regions. (In Western Siberia 11.3-fold lower, in Eastern Siberia 30.9-fold lower than in the Central economic region.) In recent years a trend has been spotted toward an increase in the growth rate of the Siberian population, and in Eastern Siberia it is close to the national average, but, as can be seen from the table, as a whole Siberia still lags behind the other regions of the nation in demographic dynamics.

Hence the acuteness of the conflict between the slowly growing influx of labor resources and the rapidly growing amount of work, particularly in areas of pioneer development. The sociologists must study this conflict and help resolve it.

From the report of T. I. Zaslavskaya:

"The quantitative and qualitative scarcity of personnel is presently one of the main obstacles to the balanced and economically effective development of the Siberian economy. This is the complaint of all the sectors, virtually all the oblasts and krais, the cities and rural regions. In recent years the migration indicators have improved in Siberia, but a noticeable migration increment is observable only in the north of Tyumenskaya Oblast and in the zone of the BAM.

"There has been talk about the scarcity of personnel in the Eastern regions for about 20 years, however the economic necessity of the rapid development of Siberia in the interests of the entire nation forces us to assert that we can no longer put off the measures aimed at attracting people to Siberia, and it is time to move on to implementing a program which would encourage a certain transferral of labor resources to the east.

"At present the most acute social problem in Siberia is the housing shortage, as well as its poor quality and extremely uneven distribution over the territory of the region. For retaining personnel under the complex climatic conditions of the Ob' North, the zone of the BAM and in other regions, here preferential housing conditions must be created for the population. But in actual terms everything is developing differently. In the Southwest, where the living conditions are more favorable, the housing situation is significantly better than in the Northeast where the climate is severe and the conditions of human existence can be defined as extreme. Thus, in the regions of the Tyumen' North the availability of housing is 2.5-fold less than the standard level.

"It is paradoxical that against this background a trend is developing not for an increase but rather for a decline in the scale of housing construction. Thus, in rural localities over the Tenth Five-Year Plan 1.5-fold less housing was built in comparison with the Seventh Five-Year Plan. And the interesting thing is that the volumes of state housing construction are growing while individual, cooperative and kolkhoz construction is declining sharply, and this also reduces the general indicators.

"Incidentally, an analogous picture is also observable in the cities. Some 15 years ago, 48 percent of the urban housing was built by state organizations in Siberia and 52 percent by the population. At present the ratio has changed to 81 percent to 19 percent. As a result another contradiction arises. The population has money but nothing to spend it on, while at the same time the people are

deprived of an opportunity to improve their housing conditions. The solution is seen in providing greater opportunities for individual and cooperative construction.

"Siberian scientists consider it essential to implement a whole range of measures in order to bring the housing availability standards in Siberia (considering also the level of public amenities) up to the average Republic level during the 11th Five-Year Plan.

"Secondly there is the income level. The real income of the Siberian population at present is lower than in the Union republics and in many regions of the RSFSR. Moreover, Siberia is more poorly supplied with foodstuffs and industrial goods. The per capita commodity turnover in Siberia is 5 percent lower than the average Republic level, and the limited opportunities to spend money on satisfying material and spiritual needs do not encourage an interest in labor.

"The logic of resolving social contradictions demands that over the long run the Siberians receive priority in the income level, and for this it is advisable to increase the regional coefficient in Siberia considering the real cost of living and to set additional payments and vacation time for the number of years worked in Siberia.

"It must be pointed out that the norms which presently are in effect and determine the development of the social and service infrastructure on the territory of the nation are obsolete on the methodological level. These are the 'impersonal' per capita norms which do not consider the living conditions and wages of the individual person. Here, of course, a clear differentiation is essential.

"I would also like to draw attention to the circumstance that the share of nonproduction capital investments in Siberia is significantly lower than the USSR average. The USSR Gosgrazhdanstroy [State Committee for Civil Construction and Architecture] has proposed rectifying this ratio. We, the sociologists, fully agree with this proposal, because the savings in the nonproduction sphere give rise to negative social processes and ultimately end up with great losses in the production sphere."

The shortage of personnel can be compensated for by their skills. But the problem of skilled personnel in Siberia also is among the most acute. In the Ninth Five-Year Plan, the sociologists asserted, the number of specialists with a higher education in the Siberian economy was below the national and republic averages.

At present, Siberia and the Far East have 107 VUZes where during the current academic year 584,000 students were enrolled.

Nevertheless....

From the report of the RSFSR Ministry of Higher and Specialized Secondary Education, Academician I. F. Obratsov:

"Regardless of the fact that over the last two five-year plans the number of students in this region has increased by 32 percent (by 21 percent as a whole for the RSFSR) and that the regions of Siberia and the Far East constantly receive a significant portion of the specialists from the other regions of the nation, the

saturation of the Siberian economy with specialists still remains unsatisfactory. The scientific educational potential of Siberia still does not meet its needs and its growth rates still lag significantly behind the development of the production sphere.

"As calculations have shown, in the future the annual need for an influx of specialists with a higher education will rise in Siberia to approximately 100,000 persons. The local VUZes will produce 80,000, while Siberia should obtain the remainder under special training from the VUZes of other republics. Over the long run we must plan to train personnel in our own higher schools.

"The conference participants are well aware that in the nation and particularly in Siberia, because of the demographic fluctuations, the number of school children is dropping sharply. Considering the economic, demographic and other particular features in the development of the Eastern regions of Russia, the RSFSR Ministry of Higher and Specialized Secondary Education has worked out a special program which envisages preferential support for the Siberian VUZes and the creation of the necessary conditions for a qualitative growth of education in Siberia."

It must be pointed out that the section on "Scientific and Educational Potential" was the largest. And dissatisfaction with the quality of higher education in Siberia could be heard in many speeches at the session of this section and in its materials.

As is known, approximately one-eighth of the VUZes and one-tenth of all the nation's VUZ students are concentrated in the eastern regions. This conforms to the general structure of the population distribution. Unfortunately, as was pointed out at the conference, there is no such comparability when the question of the faculty comes up. As a whole for the nation, there is an average of 11.4 students for each instructor, including 6.3 correspondence students (the data for the beginning of 1978). But for the Siberian VUZes the analogous figures are 15.8 and 9.5. The level of pedagogues in the Siberian VUZes is approximately 1.5-fold below the national average.

With the relatively rapid development rate of the Siberian VUZes, the faculty is being added to at an inadequate rate. As a result there has been a continuous increase in the average teaching load per instructor. The reasons for the personnel difficulties in the VUZes are sufficiently well known. The main one is the lack of housing and living conditions. A doctor, professor or docent--persons of this skill level make higher demands upon the range of living conditions, and it is difficult for Siberia to compete here with many, many regions of the nation. And it ends up that during a year (for example, in 1978) the Siberian VUZes lost 1,826 instructors, including 20 doctors of sciences and professors and 380 candidates of sciences and docents.

The Siberian VUZes (with the exception of those in Tomsk) have also fallen behind in terms of the development of the network of special-problem, sectorial laboratories.

In generalizing the work of the section, the dean of Novosibirsk University N. G. Zagoruyko stated:

"The members of the section were unanimous in assessing the importance of higher education for Siberia. Its development is one of the main elements in the growth of the productive forces. But the scientific and educational potential of Siberia as yet does not meet the demands of the region's socioeconomic development.

"The section feels that we must be specially concerned with the questions of the location and specialization of the VUZes in the eastern regions and reports with satisfaction to the conference participants that this question has gained an organized solution. According to the assignment of the RSFSR Council of Ministers, a working group is to be organized based on the Novosibirsk State University. Here a major role should also be played by the coordinating council which would regulate cooperation between the RSFSR Ministry of Higher and Specialized Secondary Education and the Siberian Division of the USSR Academy of Sciences."

The reader will understand that this report takes up only fragments, only "excerpts" from the conference materials and that entire areas of research on a multiplicity of specific problems lie outside this report, as do disputed ideas, proposals to overcome recognized contradictions and many conclusions from an analysis of various situations.

And at present we would like to offer for your attention one other conversation "extracted" during the days of the conference in the hope that practical experience is of equal significance as analytical research.

In Siberia there is a city where precisely specialist personnel is the most stable. And this is a city which has solved the social questions more successfully than many others. And this is a city the atmosphere in which is spoken of with particular respect by people.

It is a question of Noril'sk. We spoke with the director of the Noril'sk Mining and Metallurgical Combine, Boris Ivanovich Kolesnikov.

B. I. Kolesnikov:

"By the beginning of the development of the Talnakhskoye deposit, the number of persons living in Noril'sk was 120,000. There were 60,000 workers and it was a formed, efficient collective. And since then, in approximately 17 years, the population of the city has doubled and is 240,000 (I have in mind also the worker settlements). In just the last 10 years another 80,000 persons came to live in Noril'sk.

"Such growth has required energetic measures to develop the infrastructure. While in the Eighth Five-Year Plan we spent 170 million rubles on capital investments for these purposes, in the Ninth, 270 million, and in the Tenth up to 520 million. That is, almost double over a five-year plan. For the sake of what? For the sake of retaining the personnel and creating a stable collective which could carry out the tasks confronting the combine.

"During the Ninth Five-Year Plan we completed 630,000 m² of housing, and in the Tenth we will erect 530,000 m². Last year we reached an annual volume of 200,000 m² and will keep at this level evidently up to 1985 inclusively. But the development of the city is not restricted merely to housing construction. Each year we build

approximately 12 social and service projects. Among them are 5 nurseries (and we feel that they are among the best in the nation. Each 300-place nursery has a swimming pool), and 2 schools with approximately 2,000 places. Incidentally, let us take a look at what will finally be built in Noril'sk over the Tenth Five-Year Plan. We have already mentioned the 930,000 m² of housing. There will also be 10 schools and vocational-technical schools with 11,000 places. Two hospitals with 400 beds. Two polyclinics. Six sports facilities. And there will also be a sanatorium in the greater Moscow area and a Pioneer camp in the region of Minusinsk.

"These, seemingly, are large volumes of housing construction, but are still far from the norms. Beyond 1980 we must build another 1.4 million m² of housing, 30 nurseries for approximately 8,500 children, 6-7 schools, 5 polyclinics and hospitals with 1,300 places.... The program for the 11th Five-Year Plan has been estimated at 600 million rubles of capital investments and we have already created the production facilities for carrying it out. During the Tenth Five-Year Plan we completed 3 large-panel housing construction plants which turn out new-series housing. We also have plants producing prefabricated reinforced concrete for social and cultural projects. We build them serially. For example, last year alone we completed 2 serially-produced gymnasiums with an area of 1,300 m² each. And of course Noril'sk pays the greatest attention to children. Certainly ultimately their health determines our future. Each year 4,000 children are born in Noril'sk and the city has a total of 60,000 of them. These figures also lie at the basis of the construction program.

"I feel that the solution to social problems in Noril'sk is facilitated by the uniqueness of the situation. All civil construction is financed by the combine, everything is in the same hands, and this is all for the good. The combine director has the right to approve plans costing up to 6 million rubles and this is a very important circumstance. If I had to turn to the ministry for each apartment house or each nursery I would have no time to work. And just what is 6 million rubles? Well, a nine-story apartment building with 140 apartments costs 3 million rubles, a nursery is approximately 1.5 million, a large school is 2.5 million, and a polyclinic is on the order of 1.7 million rubles.

"It is also important that we have our own design facilities. This is Noril'skproyekt [Noril'sk Design Institute] which is part of the combine. All civil projects are designed here. The program for civil construction is worked out collectively by the party gorkom, by the city executive committee and by the combine administration.

"I am hopeful that by the end of the new five-year plan Noril'sk will look better than any other city in Siberia in terms of all the indicators of the standard of living. And for this we do not need even to increase the volume. It is merely a matter of working on the same level which we have reached.

"And in conclusion a word about the Noril'sk 'health five-year plan' about which rather a lot has been said. This is not only a slogan. With the help of scientists from the Siberian Division of the Academy of Medical Sciences [AMN], we have actually approached that moment when we will record all the data on the health of each resident, put this into a computer and can observe its state over time. As well as predict possible changes. But the main thing is to realize the central idea of the 'health five-year plan': not only to treat the sick but above all prevent a possible ailment. We have many persons who have worked 25 years at the combine in

shops with severe working conditions. The average period of employment in each shop is a minimum of 10 years. I feel that this will increase.

"The 'polar stress syndrome'? This does exist. But I myself have never experienced it. Possibly because I have no time...."

And possibly also because the native Siberian, Boris Ivanovich Kolesnikov, has lived almost 40 years in Noril'sk. Over the 30 years of employment at the combine, he has been on sick leave only once. For Siberia, it must be admitted, this is a rare case, or more accurately for present-day Siberia, because, according to medical observations, "the migration factors and the mobility of the population play an important role in forming the health level," and in Siberia "certain negative consequences of scientific and technical progress at times are aggravated by the natural climatic conditions, by the underdeveloped infrastructure and by other factors." Because of this the solving of the problem of improving the health level of the Siberians "goes beyond the limits of purely medical problems and rests on improving all aspects of the life support system."

Siberian medics, as an example of a systematic approach to "health management," again mention the program of the "Health Five-Year Plan of the Noril'sk Industrial Region for 1976-1980." Thus, in the weekly ZA NAUKU V SIBIRI, the chairman of the Siberian Division of the AMN, Academician of the AMN Yu. I. Borodin and Academician of the AMN V. P. Kaznacheyev wrote: "Here (in Noril'sk), along with improving all elements of the public health system, measures have been carried out to protect the environment, to improve working conditions and the organization of labor, to optimize working and rest conditions, to improve the system of vocational guidance and vocational placement, the system of moral and physical education, to optimize the sphere of cultural and domestic services, the food system and so forth. Preliminary analysis has shown that such an approach, along with the positive social consequences (the reduction in personnel turnover and antisocial phenomena) in terms of purely medical indicators provides an economic effect running into millions of rubles. The results of introducing the 'Watch,' 'Sun--Climate--Man' and other programs lead to analogous conclusions."

Siberia is home for 20 million Soviet people. Judging from the socioeconomic forecasts, it should become the home for millions of other people.

The biologists and ecologists are also concerned and alarmed for Siberia precisely as a home in which man would feel himself to be happy, at ease and secure, a home in which all is good and no one is treated badly. For them the view of Siberia as an extracting base and as a working shop seems narrow and one-sided. To such a view they have added their own observations and calculations which demand the careful and considerate use of the far from infinite natural resources of Siberia.

From the report of Academician D. K. Belyayev:

"On the problem of the natural ecosystem of Siberia. First of all a few words on the state of the soils. The soil resources of Siberia are enormous: 43 percent of the USSR area or 965 million hectares. But in their majority these are soils which have formed on permafrost rock and they are subjected to extended seasonal freezing, swamping up and salinization. This sharply reduces their biological productivity."

"In agricultural terms Siberia, with the exception of the extreme south, has been little developed. Not more than 6 percent of the territory (60 million hectares) is occupied by all types of agricultural land, and just 3 percent of the total area (around 30 million hectares) is plowed land.

"It is essential to bear in mind that in the immediate future agriculture will develop by intensification and the demand for land resources for agricultural use will not increase in our nation. But the land available and suitable for these purposes is declining. Over the last 15 years the nation lost at least 15-20 million hectares of productive land. Everywhere, with the exception of Siberia and the Far East, the soils are virtually completely in agricultural use. For this reason the development of new territories will be carried out primarily from the eastern regions.

"However, in Siberia, as a result of the industrial development of the territory, as a result of construction and poor agricultural practices, there has been an intense process of the destruction of the soil cover. The scale of the confiscation and destruction of soil has also increased with the rapidly occurring industrialization. Over the last decade alone, more than 1 million hectares of largely the best land have been used for the needs of construction and industry in Novosibirskaya, Kemerovskaya and Irkutskaya Oblasts and in Krasnoyarskiy Kray. Over the long run in Siberia, more than 3.5 million hectares will be employed in just mining and consequently this amount will also be taken out of use. This cannot help but be reflected in the balance of productive land.

"As for the plant resources. The total area of hayfields and pastures in Siberia is over 34 million hectares. This is the largest area. But, unfortunately, in Siberia this is irrationally used. Because of this there has been a sharp decline in the productiveness of the grass stand, irreversible processes of soil degradation are developing and more and more pastures are being turned into sterile wasteland.

"The Barabinskaya lowlands could be used as an example. Here, as a result of the plowing up of significant hayfields and pasture areas, the ecological equilibrium of the biogeocenoses has been disrupted. This has not only altered the specific composition and worsened the structure of the grass stand, but has also completely destroyed the meadow communities.

"In the plant cover of Siberia of great importance are the wild-growing useful plants which are an irreplaceable raw material for the pharmaceutical and other sectors of industry. At present around 45 medical preparations are made from these plants.

"But the resources of wild-growing plants (and there are more than 700 species in Siberia) are used extremely unevenly and irresponsibly. In thickly populated areas they are on the brink of disappearing, and in inaccessible areas they remain unused. The securing of useful plants is not supervised by anyone and often this is done by predatory methods, without observing the rules.

"The Siberian forests are also unevenly used. In the southern forestry establishments and in those adjacent to the Transsiberian line, felling is carried out significantly above the calculated cutting rate. At the same time, the northern and northeastern regions with up to 80 percent of the exploitable reserves provide less than 20 percent of the total felling volume.

"The state of forest conservation and the actual use of the forests cause serious concern. The forests are threatened by fires, predominantly the highly productive stands of pine and cedar are being felled, and the use of the reserves of deciduous wood is extremely insignificant.

"As for the resources of the animal world. In Siberia there are 202 species of mammals, 470 species of birds and 90 species of fish. Many of these species are unique and represent a national treasure.

"Siberia produces around 90 percent of all the fur caught in wild nature. Here are found the basic supplies of sable, Siberian weasel, stoat, Arctic fox, squirrel and muskrat. However the number of many of these species of fur-bearing animals is constantly declining. Over the last 15 years, the supply of sable has declined, the squirrel catch has declined by 2.5-fold in Western Siberia, stoat has declined by 6-fold, and muskrat by 10-fold.

"The state of hunting birds also causes serious alarm.

"Of particular significance is the question of the protection of species of animals which are threatened with extinction. The USSR Red Book contains 25 Siberian mammal species and this represents one-half of the mammals 'populating' this alarming book.

"The question of the fish stocks of Siberia is very disconcerting. Because of the quality of water and hydroconstruction, the habitat conditions for fish have deteriorated sharply. On the Ob', for example, because of the dams at Novosibirsk and Ist'-Kamenogorsk, the sturgeon has lost more than 40 percent of its spawning grounds. The same thing is also observed on the Yenisey.

"Thus, the Siberian ecosystem even now is under strong pressure.

"But there is a real opportunity for organizing a planned landscape of construction in the intensely industrially developed areas, and this would substantially restrict the losses of land.

"By legislation order must be introduced into the utilization of the natural phytocenoses, there must be systematic planning and implementation of work to reconstruct and rationally utilize the plant cover, and the predatory use of natural plant resources and the wearing out of them must be halted.

"For better utilizing and protecting the Siberian forests there must be sharp intensification of forest management, particularly in the zones of the TPK. The basic path for the rational utilization of forest resources lies in rebasing felling into the northern heavily forested areas and in moving from the pine and cedar forests which have been depleted by overfelling to the deciduous ones.

"There is an obvious pressing need for a number of organizational and legislative decisions on protecting the animal world of Siberia.

"Under present-day conditions Siberian fisheries are unable to count on a natural increase in the fish stocks. It is essential to carry out a range of fish management and fisheries measures, including the construction of fish hatcheries, nurseries and so forth and not only in the river basins but chiefly on the basis of promising lakes.

"In the range of all the questions taken up at the conference, it is completely essential to discuss the ecological prospects of all the major projects and programs for the economic development of Siberia."

The negative consequences of hurried development and awkward management are so apparent that more and more people are appearing who are ready to declare any progress to be an evil and who do not wish to see any other way out of the "nature-economy" contradiction except in halting any economic activity....

But mankind has experience in successfully solving this problem. And our nation is doing a great deal in seeking a way out of the acute conflict situations which continuously arise in the relationships of creative man and giving nature.

From the report of the chairman of the State Committee for Hydrometeorology, Corresponding Member of the USSR Academy of Sciences Yu. A. Izrael':

"At present, large-scale efforts are being made aimed at improving the protection of the environment and the valuable raw material resources of Siberia. As a consequence of the various measures to protect the atmosphere, in a number of cities there has been a drop in the level of the polluting of air with harmful substances. Thus, a decline in the concentration of a majority of the basic impurities has been noted in Irkutsk and Novosibirsk. A noticeable improvement in the air has been observed in the atmosphere of Bratsk, Angarsk, Usol'ye Sibirskoye and Baykal'sk.

"As a result of carrying out water conservation measures, the quality of water has been improved in a number of water facilities.

"But the overall rapid national economic development pace requires the taking of more decisive measures in the area of the conservation and rational utilization of natural resources.

"The scientific research being carried out at a number of institutes of the Siberian Division and other scientific research facilities has played an enormous role in solving these questions. But the level and pace of scientific research still do not fully ensure environmental conservation.

"With good reason great attention was given to all these questions in the instructions of Comrade L. I. Brezhnev and the recommendations during his trip to the regions of Siberia and the Far East as well as in the Decree of the CPSU Central Committee and the USSR Council of Ministers of 1 December 1978 'On Additional Measures to Strengthen Environmental Conservation and Improve the Utilization of Natural Resources.'

"Goskomgidromet [State Committee for Hydrometeorology] together with the Siberian Division of the USSR Academy of Sciences and other ministries and departments in 1978 prepared the 'Proposals on Ensuring Environmental Conservation and the Rational Utilization of Nature in the Regions of Siberia and the Far East.' The institutes of Goskomgidromet have worked out a preliminary forecast for changes in the state of the environment under the impact of the projects at the Kansk-Achinsk fuel and energy complex, a series of regional forecasts for the state of the environment under the influence of anthropogenic activities on the territory of Yakutia, in the regions of the route of the BAM and so forth.

"Research has also been done on the questions of environmental conservation and the rational utilization of natural resources in the region of Lake Baykal, including in the Buryat ASSR, Irkutskaya and Chitinskaya oblasts.

"Some 32 scientific subdivisions of the Siberian Division and 25 organizations of other departments are participating in carrying out the ecological assignments under the Siberia Program."

Is it possible to sum up the work of such a representative and fruitful conference? It itself generalized the activities of many scientific institutions and analyzed the practical experience of the turbulent Siberian decade. The Chairman of the Siberian Division of the USSR Academy of Sciences, Academician V. A. Koptug, had this to say about the role played by such conferences in the life of Siberia.

"Over the years of Soviet power Siberia has come a great distance in economic and cultural development and the USSR Academy of Sciences has played a great role in determining the development paths in all stages of this progress. Beginning in 1926, it, in accord with the party and government decisions, has held conferences and congresses devoted to discussing various aspects in the economic development of the eastern regions of our nation.

"The first congress of scientific and technical intelligentsia was held in 1926 in Novosibirsk, and its decisions were used in working out the 15-year development plan of this rich region. Two postwar conferences in 1947 and 1958 were held in Irkutsk and were devoted to the Angara-Yenisey program for the development of Eastern Siberia. The discussion which took place at these conferences contributed to the taking of decisions to build the largest series of power plants and to develop many sectors of the adjacent regions.

"The 1969 conference was held in Novosibirsk, it discussed a broad range of questions concerning the development of the Eastern regions and made a substantial contribution to the elaboration of the Ninth and Tenth five-year plans.

"Under the party's decision, Siberia during the last 10 years has been developing at a higher pace than the national economy as an average.

"Our present conference is being held on the boundary between two five-year plans, when the drawing up of the plan is being completed for the following 5-year period and for the more distant period up to 1990. The conference was preceded by great preparatory work. Scientific practical conferences were held in Irkutskaya, Novosibirskaya, Tomskaya and other oblasts. The sectorial and regional questions were examined at Krasnoyarsk, Chita and other cities of Siberia. The papers published for the conference were promptly disseminated to the institutions and organizations participating in its work.

"Our conference is a wrap-up and its materials contain the most important questions and all the most important that was discussed at the previous conferences of the krais and oblasts. We have met with the representatives of the central party bodies, the ministries and the sectors in order to discuss the most urgent problems of Siberia's development, and particularly the interregional and intersectorial problems."

At the concluding full session, the President of the USSR Academy of Sciences, Academician A. P. Aleksandrov, emphasized that in the course of discussing the key problems relating to the development of Siberia's productive forces, at the conference many interesting proposals were made aimed at increasing the effective development of the natural riches of this region. All the proposals must be carefully studied from the viewpoint of the sequence of measures, considering the approximate ratio of the amounts of investments into the various industrial sectors, and so forth in order to have well thought-out variations for the integrated development of Siberia depending upon the amounts allocated and in order to obtain as quickly as possible a return from those projects which we are to create. This is an important task confronting all workers in science and production, and particularly the economists. It is essential to outline those national economic development paths whereby both the raw materials, the energy and the products of industry and agriculture would be utilized with maximum efficiency.

The last words of the president of the Academy of Sciences could obviously be put as the epigraph for all the many-day discussions which were heard at the conference: "With maximum efficiency!"

Conference report written by Z. M. Ibragimova.

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